

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
RESEARCH AND TECHNOLOGY RESUME

TITLE

NEAR-INFRARED OBSERVATIONS OF VENUS

PERFORMING ORGANIZATION

JET PROPULSION LABORATORY
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INVESTIGATOR'S NAME

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DESCRIPTION (a. Brief statement on strategy of investigation. b. Progress and accomplishments of prior year. c. What will be accomplished this year, as well as how and why. and d. Summary bibliography)

a. Ground-based near-infrared observations of the Venus night side reveal anomalous bright features at wavelengths near 1.7 and 2.3 microns (Allen and Crawford, 1984; Allen, 1987). These features are thought to be formed as thermal radiation from the hot lower atmosphere leaks through holes in the Middle and/or Lower sulfuric acid cloud decks. Because these holes allow radiation to escape from deep in the troposphere, they provide an opportunity to significantly improve our understanding of the composition, thermal structure, and dynamics of this region of the Venus atmosphere. New near-infrared observations of the Venus night side are needed to address these questions.

b. During the first year of this program, we requested and received observing time at six sites and organized a highly-skilled team: KPNO 1.3 m, Probst (5/17-23, 6/24-30); TMO 24-inch, Baines, Crisp (5/17-30), McKelvey (6/21-30); Palomar 200-inch, Hester, Beichman, Crisp (5/28-6/2), Soiffer, Mathews (6/24-30); Univ HI 88-inch, Sinton, Ragert, Allen (5/28-30); UKRT, Lugton (5/24-27); CHFT, Malliard (4/24-29).

This wide array of sites should allow us to collect the data needed to meet all of our proposed objectives. J. Malliard used the CHFT FTS to obtain high resolution spectra of the Venus night side. We are currently collecting our first images of Venus from Kitt Peak and Table Mountain. The state-of-the-art infrared array detectors that are being used at these sites are allowing us to collect hundreds of high-quality images during each observing day. These images show the expected bright features, but we have not yet begun to track these features. We anticipate submitting one or more publications that summarize the results of these observations before the end of FY 88.

c. High resolution spectroscopic and imaging observations of the Venus night side will be used to estimate the column abundances of CO, HF, HCL, and other important trace gases which have absorption features at wavelengths near 1.7 and 2.3 microns in the Venus night-side troposphere. Images of the Venus night side will be processed to 1) better constrain the altitude range where the bright features are produced, 2) track horizontal winds at these levels, and 3) determine the fractional area covered by bright features to assess the impact of the these leaks on the atmospheric Greenhouse mechanism. We will also collaborate with members of the Galileo Project to assess the feasibility of carrying our similar observations during the Venus flyby.

d. Allen, D. "The Dark Side of Venus," *Icarus* 69, 221-229, 1987. Allen, D. and J.W. Crawford, "Cloud Structure on the Dark Side of Venus," *Nature* 307, 222-224, 1984.

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